



Solar Energy Technologies Program

Distributed PV Permitting and Inspection Processes:

Case Studies from: Austin, Portland, Salt Lake City

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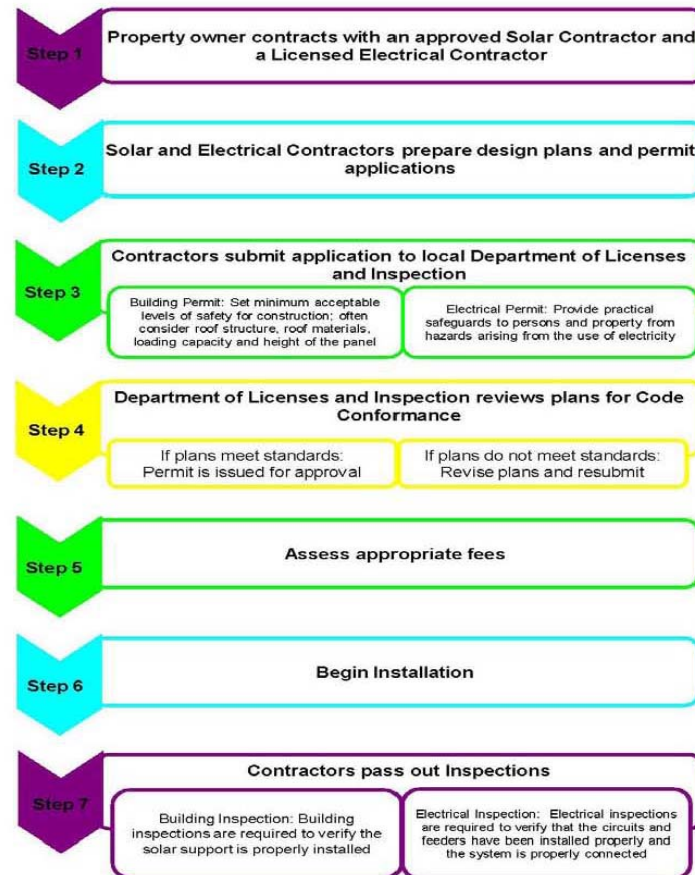
U.S. Department of Energy

- **SolarTech**
 - Leader in industry efforts to streamline the permitting process
 - Goal: Reduce permit times by 50% by 2011, resulting in \$1-2,000 saved in reduced cost per install for both cities and solar installers
- **Vote Solar**
 - Project Permit: user input database of permitting time and cost in communities across the country
 - Intended use: transparency and advocacy
- **Sierra Club**
 - Performed comparative studies of permit fees in California
- **Solar America Board for Codes and Standards**
 - October 2009 paper on expedited permitting includes sample site plan, diagrams and checklist

Key Study Participants

REC Solar	Texas Solar Power Company		Ontility	Austin Energy
Lighthouse Solar	Sandia National Labs	NREL	Gardner Engineering	Imagine Energy
City of Salt Lake	City of Austin	City of Portland	Green Power Solutions	CH2M Hill

The figure below presents a process diagram that identifies the 7 steps involved in the permitting and inspection processes. Prior to the implementation of step 1, one initiates the sales process by requesting bids from various solar contractors. Once an agreement has been settled upon, you may begin the permitting and inspection process.



With the final inspection now completed and approved, the process moves to the utility, who handle the interconnection of the PV system to the grid. This essentially means that the PV system can be turned on and begin operation.

Considered the following variables

	Austin	Portland	Salt Lake City
Population	757,688	582,130	181,698
Utility	Municipal	IOU	IOU
Volume of Installations	1,000+	200+	200+



- Focused on residential process; commercial process varies widely with system size and design
- Benchmarked Cities' workflow from application submittal to final inspection from building department and solar contractor perspective
 - Agent and Task
 - Work time: actual time spent performing task at hand
 - Wait time: time it takes for process to move from one step to the next
 - Salary Information
 - Public Database for Building Department employees
 - Contractor Salary: Assumed \$35.00/hour, companies may use administrative assistant, installer, engineer. Based on lack of consistency chose to average across cities.

	Austin	Portland	Salt Lake City
Electrical Permit Fee	\$94.00	\$111.00	\$65.99
Building Permit Fee	\$0- \$365.00	\$4.77	\$0- \$300
Total Permit Fee	\$94.00- \$459.00	\$129.09	\$65.99- \$365.99

- **Austin**
 - Flat fee electrical permit
 - Building permit only applies when “off the roof” system: valuation minus cost of panels
- **Portland**
 - Flat fee, building and electrical plus 12% state surcharge
- **Salt Lake City**
 - Flat fee single family home electrical permit
 - Building permits: inconsistent requirements, valuation minus cost of panels

Actual Work Time

	Task	Work Time		
		Austin	Portland	Salt Lake City
Building Department	Receive and file application	16- 27 min	12 min	4- 10 min
	Structural review of application	0- 20 min	15- 30 min	17- 35 min
	Electrical review of application	12- 20 min	15- 30 min	15- 30 min
	Application processing and notification	11- 25 min	9 min	10 min
	Inspection	1- 2 hrs	1- 2 hrs	1hr 2 min- 2hrs 5 min
		1hr 39min- 3hrs 32 min	1hr 41 min- 3hrs 21 min	1hr 48 min- 3hrs 30min
Installation/ Contractor	Complete and submits application	40 min- 1hr 25 min	1hr 10 min- 1hr 55 min	3 hrs 30 min- 5hrs 5 min
	Permit pick up and payment	7 min- 2hrs 5 min	45 min	30 min- 1hr
	Schedules and attends site inspection	3hrs 35 min- 4hrs 35 min	1hr 35 min- 2hrs 35 min	1hr 5 min- 2hrs 10 min
		4hrs 22min- 8hrs 5 min	3hrs 30 min- 5hrs 15 min	5hrs 5min- 8hrs 15 min

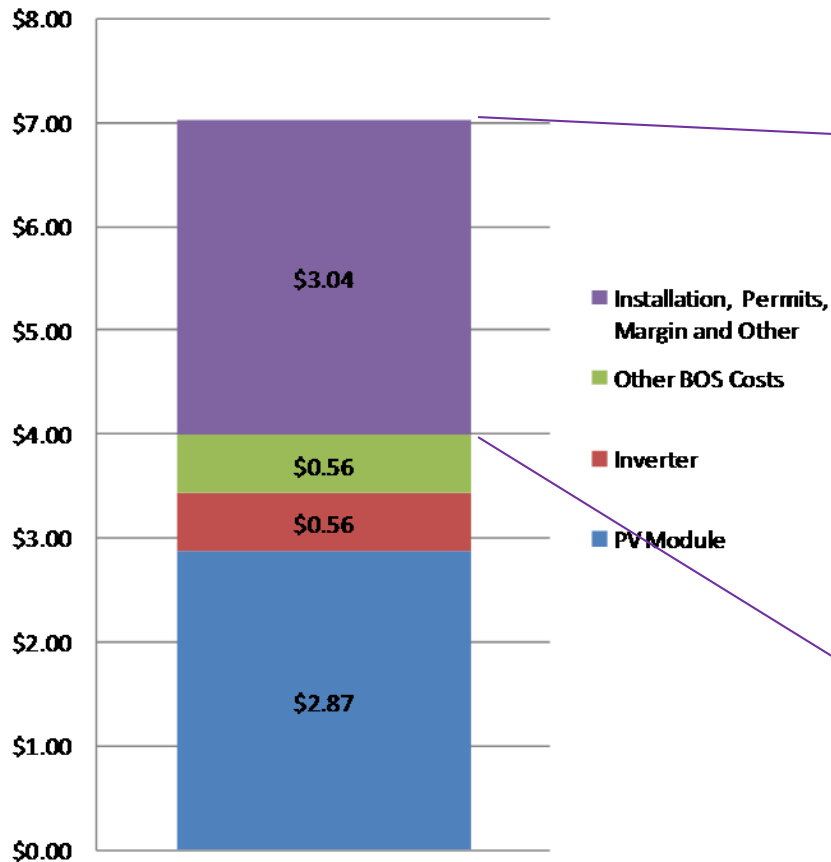
Total Cost of Labor \$/Watt

	Austin	Portland	Salt Lake City
Building Department	\$0.01- \$0.02	\$0.02- \$0.03	\$0.01- \$0.03
Contractor	\$0.03- \$0.07	\$0.03- \$0.05	\$0.04- \$0.07

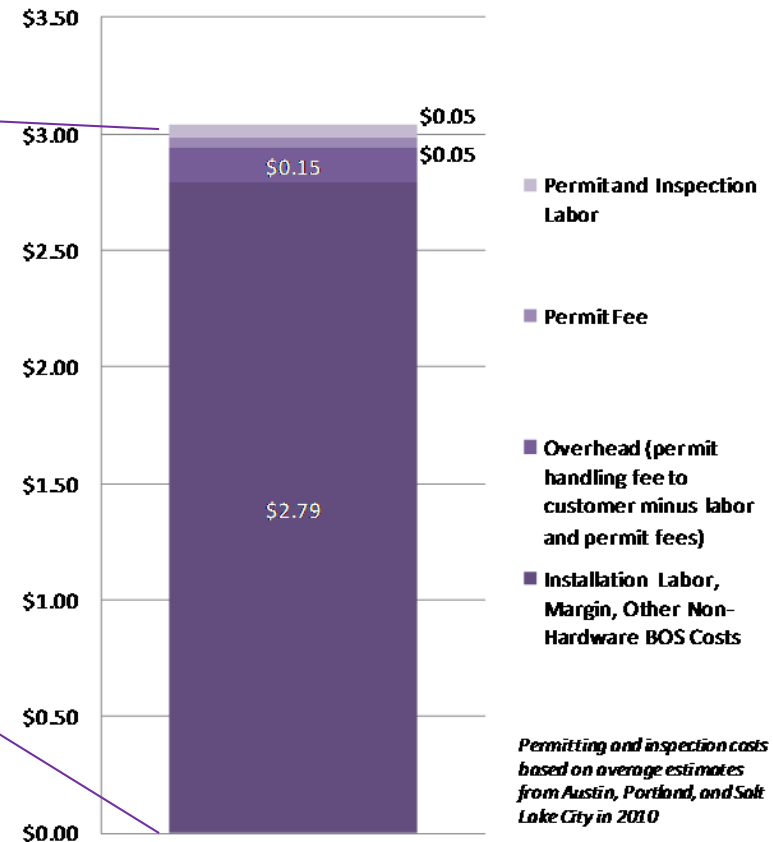
- *Ranges in cost of labor vary due to personal preference and the option to subcontract out engineering work*
- **Austin**
 - Request for inspection requires 2 hours of labor for the solar contracting office
 - Paperwork is mandated by the solar inspector at Austin Energy
- **Portland**
 - About 50% of contractors subcontract out their electrical work
 - Electronic submittal still labor intensive
- **Salt Lake City**
 - Common for contractors to send out both electrical and structural drawings
 - Adds about a week to the process

Permitting and Inspection Breakdown

2009 Residential Scale PV LCOE Breakdown



Contribution of Permitting and Inspection Process to Non-Hardware BOS Costs for Residential Scale PV



	Austin	Portland	Salt Lake City
Cost of Labor	\$44.56 to \$94.86	\$64.93 to \$131.99	\$50.70 to \$99.48
Permit Fee	\$94 to \$459	\$129.09	\$65.99 to \$365.99
Net Gain/Loss	+\$49.44 to +\$364.14	- \$2.90 to +\$64.16	+\$15.29 to +\$266.51

- Different structure city to city
 - Waive permit fees completely
 - Operate at a loss to show solar is a priority
 - Exorbitant fees
- To have a sustainable process, cities should be making enough to cover their costs

Wait Time in Business Days

	Austin	Portland	Salt Lake City
Permit	1	1-3	1-8
Install	3-5	3-5	3-5
Inspection	9-17	1- 10	7- 14
Total Wait Time	13- 23	5-18	11- 27

- Assumption: 3- 5 day period for installation

Translating Project Delays to Industry Opportunity Costs

- **Concept**
 - Project delays have multiple costs that must be absorbed by the contractor or passed through to the customer (market)
 - Ultimately, lost time = lost kWh generation = lost \$ savings
- **Cost elements**
 - Engineering overhead, sunk time
 - Inventory, idle crews, trucks, etc
 - Money expended, at risk
 - Mobilization
 - Wait time forcing internal cost absorption
 - Milestone risks – ITC, MACRS, rebate payment, rebate carrying cost
- **Opportunity Cost calculation (Consumer impact)**
 - Lost solar production time (hrs) x Lost Production (kWh) x Value (\$/kWh) = ____
 - Varies by region, location, system size, technology, utility rate/usage profile
 - Improving consumer cash position can be linked to faster economic recovery

- **Increase Accessibility of Permitting Standardization Documents**
 - Need massive outreach effort to make Solar ABC's best practices more available, potentially through Solar America Communities Outreach effort
- **Move toward Regional Standardization**
 - San Jose cross-jurisdiction collaboration
 - Oregon state-wide permitting legislation
- **Consider Pilot Project: Proposed by SolarTech**
 - Baseline the permitting and inspection process in 5-10 cities
 - One year to change and develop the permitting and inspection processes to develop replicable best practices for a variety of cities

Thank You



Energy Efficiency &
Renewable Energy



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